inepro®

PRO380-S
PRO380-Mb
PRO380-Mod

PRO 380 Series MID

DIN rail 3 phase 4 wire
DIN rail 3 phase 3 wire
energy meter

User Manual

Product version: 1.02

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2 Safety instructions

Information for your own safety
This manual does not contain all of the safety measures for operation of this meter because special operating conditions, local code requirements or local regulations may necessitate further measures. However, it does contain information which must be adhered to for your own personal safety and to avoid material damage. This information is highlighted by a warning triangle with an exclamation mark or a lightning bolt depending on the degree of actual or potential danger:

Warning
This means that failure to observe the instruction can result in death, serious injury or considerable material damage.

Caution
This means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Qualified personnel
Installation and operation of the device described in this manual may only be performed by qualified personnel. Only people that are authorized to install, connect and use this device, who have the proper knowledge about labeling and grounding electrical equipment and circuits and can do so in accordance with local (safety)regulations, are considered qualified personnel in this manual.

Use for the intended purpose
This device may only be used for the application cases specified in the catalog and the user manual and only in connection with devices and components recommended and approved by Inepro Metering B.V.

Proper handling
The prerequisites for perfect, reliable operation of the product are proper transport, storage, installation and connection, as well as proper operation and maintenance. During its operation certain parts of the meter might carry dangerous voltages.

- Only use insulated tools suitable for the voltages this meter is used for.
- Do not connect while the circuit is connected to a power or current source.
- Only place the meter in a dry environment.
- Do not mount the meter in an explosive area or exposed to dust, mildew and/or insects.
- Make sure the used wires are suitable for the maximum current of this meter.
- Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- Do not touch the meter's connection clamps directly with your bare hands, with metal, blank wire or other conducting material as you will risk an electric shock that could cause possible injury, serious injury or death.
- Make sure the protection covers are replaced after installation.

- Maintenance and repair of the meter should only be carried out by qualified personnel.
- Never break any seals (if present on this meter) to open the front cover as this might influence the functionality or accuracy of the meter, and will void all warranty.
- Do not drop, or allow physical impact to the meter as there are high precision components inside that may break and affect the meter measurement negatively.
- All clamps should be properly tightened.
- Make sure the wires fit properly in the connection clamps.
- If the wires are too thin it will cause a bad contact which can spark causing damage to the meter and its surroundings.

Exclusion of liability

We have checked the contents of this manual and every effort has been made to ensure that the descriptions are as accurate as possible. However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors or omissions in the information given. The data in this manual are checked regularly and the necessary corrections will be included in subsequent editions. If you have any suggestions, please do not hesitate to contact us.

Subject to technical modifications without notice.

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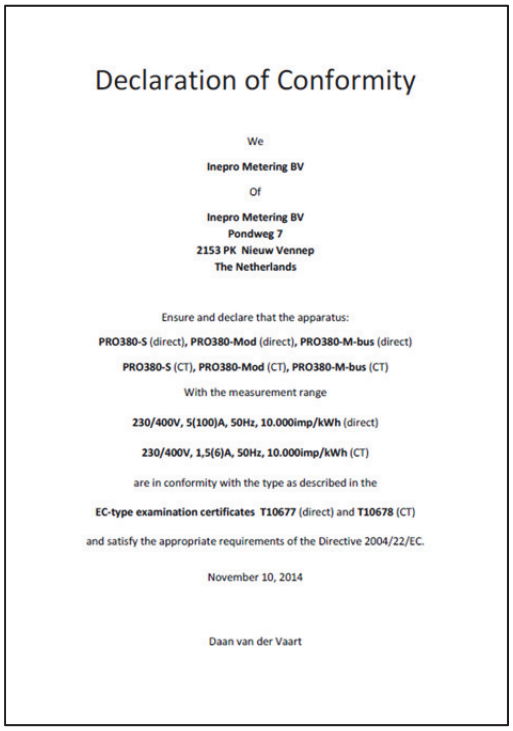
3 Foreword

Thank you for purchasing this energy meter. Inepro has a wide product range of devices. We have introduced a large number of energy meters on the market suitable for 110V AC to 400V AC (50 or 60Hz). Besides the normal energy meters we also developed our own pre-paid meters with chip card, chip card re-loaders and a complete PC management control system. For more information on other products please contact our sales department at sales@ineprometering.com or visit our website at www.ineprometering.com.

Although we produce this device according to international standards and our quality inspection is very accurate it's still possible that this device shows a defect or failure for which we do apologize. Under normal conditions your product should give you years of trouble free operation. In case there is a problem with the energy meter you should contact your distributor immediately. Most of our energy meters are sealed with a special seal. Once this seal is broken there is no possibility to claim any warranty. Therefore NEVER open an energy meter or break the seal of the device. The limited warranty is 5 years after production date, divided into various periods., after production, and only valid for production faults.

4 Certificates



Declaration of Conformity

We

Inepro Metering BV

Of

Inepro Metering BV
Pondweg 7
2153 PK Nieuw Vennep
The Netherlands

Ensure and declare that the apparatus:

PRO380-S (direct), **PRO380-Mod** (direct), **PRO380-M-bus** (direct)

PRO380-S (CT), **PRO380-Mod** (CT), **PRO380-M-bus** (CT)

With the measurement range

230/400V, 5(100)A, 50Hz, 10.000imp/kWh (direct)

230/400V, 1,5(6)A, 50Hz, 10.000imp/kWh (CT)

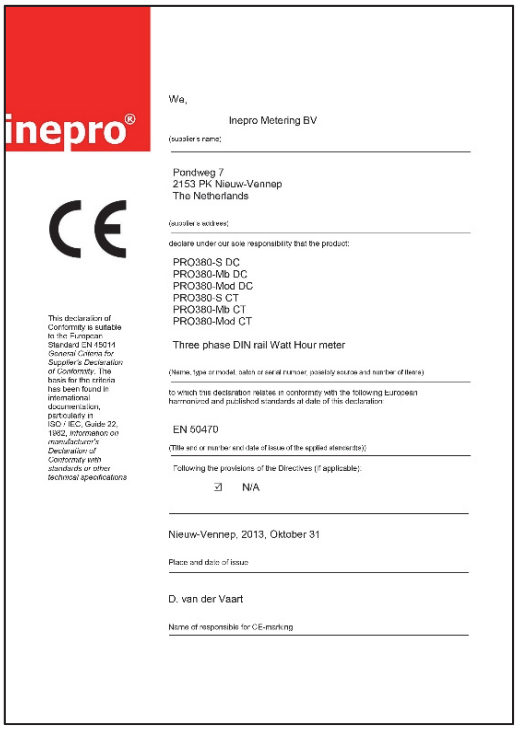
are in conformity with the type as described in the

EC-type examination certificates T10677 (direct) and **T10678** (CT)

and satisfy the appropriate requirements of the Directive 2004/22/EC.

November 10, 2014

Daan van der Vaart



inepro®

CE

This declaration of Conformity is suitable to the European Standard EN 45014 *General Criteria for Supplier's Declaration of Conformity*. The basis for the criteria has been found in international documentation, particularly in ISO / IEC Guide 22, 1982, *Information on manufacturer's Declaration of Conformity with standards or other technical specifications*

We,

Inepro Metering BV

(supplier's name)

Pondweg 7
2153 PK Nieuw-Vennep
The Netherlands

(supplier's address)

declare under our sole responsibility that the product:

PRO380-S DC
PRO380-Mb DC
PRO380-Mod DC
PRO380-S CT
PRO380-Mb CT
PRO380-Mod CT

Three phase DIN rail Watt Hour meter

(Name, type or model, batch or serial number, possibly source and number of items)

to which this declaration relates in conformity with the following European harmonized and published standards at date of this declaration

EN 50470

(Title and or number and date of issue of the applied standard(s))

Following the provisions of the Directives (if applicable):

☑ N/A

Nieuw-Vennep, 2013, Oktober 31

Place and date of issue

D. van der Vaart

Name of responsible for CE-marking

NMi

Certificate of Conformity

No. CoC-14200555-01

Applicant : Inepro Metering BV, Pondweg 7, 2153 PK Nieuw Vennep, The Netherlands

Issued by : NMi Certin B.V., Hugo de Grootplein 1, 3314 EG DORDRECHT, The Netherlands

Submitted : **Static electrical energy meter**

Manufacturer : **Inepro**
Type : **PRO380**

Characteristics :
reference voltage : 230 V
reference current : 5 A
maximum current : 100 A
class : 1 or 2 for active energy (IEC 62053-21)
B or A for active energy (EN50470-3)
2 for reactive energy (IEC 62053-23)
destined for the measurement of : electrical energy, in a
- three-phase four-wire system
- three-phase three-wire system
- one-phase two-wire system

In accordance with :
- **IEC 62052-11** "Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment"
- **IEC 62053-21** "Electricity metering equipment (AC) - Particular requirements - Part 21: Static meters for active energy (classes 1 and 2)"
- **IEC 62053-23** "Electricity metering equipment (AC) - Particular requirements - Part 23: Static meters for reactive energy (classes 2 and 3)"
- **EN 50470-1** "Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Part 1: Metering equipment (class indexes A, B and C)"
- **EN 50470-3** "Electricity metering equipment (a.c.) - Particular requirements - Part 3: Static meters for active energy (class indexes A, B and C)"
- **CLC/TR 50579** "Electricity metering equipment - Severity levels, immunity requirements and test methods for conducted disturbances in the frequency range 2 -150 kHz"

The described products are tested according to the above mentioned product standards and meet the essential requirements, based on a non-recurrent examination. The appertaining test data is presented in type evaluation reports no. NMi-14200555-01 and NMi-14200555-02 granted by NMi.

9 December 2014
NMi Certin B.V.

C. Oosterman
Head Certification Board

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Parties concerned can lodge objection against this decision, within six weeks after the date of submission, to the general manager of NMi (see "Regulation objection and appeal against decisions of NMi").

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INSPECTION RvA I 122

NMi

Certificate of Conformity

No. CoC-14200555-02

Applicant : Inepro Metering BV, Pondweg 7, 2153 PK Nieuw Vennep, The Netherlands

Issued by : NMi Certin B.V., Hugo de Grootplein 1, 3314 EG DORDRECHT, The Netherlands

Submitted : **Static electrical energy meter**

Manufacturer : **Inepro**
Type : **PRO380**

Characteristics :
reference voltage : 230 V
reference current : 1,5 A
maximum current : 6 A
class : 0,5 S for active energy (IEC 62053-22)
C for active energy (EN50470-3)
3 for reactive energy (IEC 62053-23)
destined for the measurement of : electrical energy, in a
- three-phase four-wire system
- three-phase three-wire system
- one-phase two-wire system

In accordance with :
- **IEC 62052-11** "Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment"
- **IEC 62053-22** "Electricity metering equipment (AC) - Particular requirements - Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)"
- **IEC 62053-23** "Electricity metering equipment (AC) - Particular requirements - Part 23: Static meters for reactive energy (classes 2 and 3)"
- **EN 50470-1** "Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Part 1: Metering equipment (class indexes A, B and C)"
- **EN 50470-3** "Electricity metering equipment (a.c.) - Particular requirements - Part 3: Static meters for active energy (class indexes A, B and C)"
- **CLC/TR 50579** "Electricity metering equipment - Severity levels, immunity requirements and test methods for conducted disturbances in the frequency range 2 -150 kHz"

The described products are tested according to the above mentioned product standards and meet the essential requirements, based on a non-recurrent examination. The appertaining test data is presented in type evaluation reports no. NMi-14200555-01 and NMi-14200555-02 granted by NMi.

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5 Specifications

Casing	PC flame resistant plastic
Nominal voltage (Un)	230/400V AC (3~)
Operational voltage	3*230/400V ±20%
Insulation capabilities:	
- AC voltage withstand	4KV for 1 minute
- Impulse voltage withstand	6KV – 1.2µS waveform
Basic current (Ib)	5A (1.5A for CT version)
Maximum rated current (Imax)	100A (6A for CT version)
Operational current range	0.4%Ib-Imax
Over current withstand	30Imax for 0.01s
Operational frequency range	45-60Hz
Internal power consumption	≤2W/Phase - ≤10VA/Phase (active – reactive)
Test output flash rate (RED LED)	10.000 imp/kWh
Pulse output rate	10.000, 2.000, 1.000, 100, 10, 1, 0.1 or 0.01 imp/kWh
Pulse width	
- 1.000/2.000/10.000 pulses	
○ 0 – 2.499W	40ms
○ 2.500 – 9.999W	20ms
○ 10.000 – 19.999W	10ms
○ 20.000 – 39.999W	5ms
○ > 40.000W	2,5ms
- 100 pulses	
○ 0 – 49.999W	40ms
○ > 50.000W	20ms
- Other pulses	
○ Always	40ms
Data store	The data can be stored for more than 10 years without power

5.1 Performance criteria

Operating humidity	≤ 75%
Storage humidity	≤ 95%
Operating temperature	-25°C - +55°C
Storage temperature	-30°C- +70°C
International standard	EN50470-1/3
Accuracy class	B (=1% accuracy)
Protection against penetration of dust and water	IP51
Insulating encased meter of protective class	II

5.2 Basic errors

0.05Ib	Cosφ = 1	±1.5%
0.1Ib	Cosφ = 0.5L	±1.5%
	Cosφ= 0.8C	±1.5%
0.1Ib - Imax	Cosφ = 1	±1.0%
0.2Ib - Imax	Cosφ = 0.5L	±1.0%
	Cosφ = 0.8C	±1.0%

5.3 Infra-red specification

Infrared wavelengths	900- 1000nm
Communication distance	Direct contact
Protocol	IEC62056-21:2002 (IEC1107)

5.4 M-bus communication specifications (PRO380-Mb only)

Bus type	M-bus
baud rate	300, 600, 1200, 2400, 4800 and 9600 (default)
Range	≤1000m
Downlink signal	Master to slave，Voltage modulation
Uplink signal	Slave to master，Current modulation
Cable	JYSTY （n×2×0.8）
Protocol	EN13757-3
Maximum bus load	64 meters per bus*

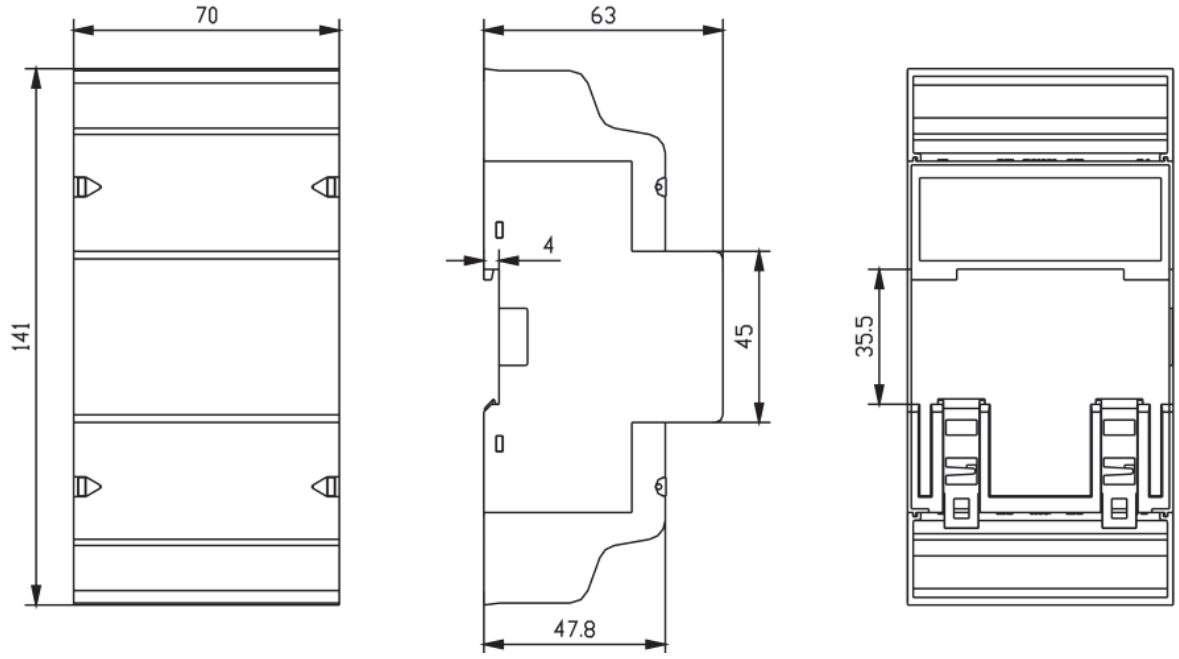
5.5 RS485 communication specifications (PRO380-Mod only)

Bus type	RS485
Protocol	MODBUS RTU with 16 bit CRC
Baud rate	1200, 2400, 4800, 9600 (default)
Address range	0-247 user settable
Maximum bus load	60 meters per bus*
Range	≤1000m

*Note that the maximum number of meters is dependent on the converter, baudrate (the higher the baudrate the smaller the number of meters which can be used) and the circumstances under which the meters are installed.

5.6 Dimensions

Height without protection cover	92,4 mm
Height	141 mm
Width	70 mm
Depth	63 mm
Max diameter power connection clamps	25 mm^2 (flex core)
	35 mm^2 (solid core)
Weight	0.39 Kg (net)



CAUTION

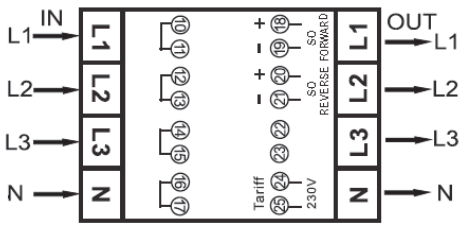
- Turn off and if possible lock all sources supplying the energy meter and the equipment that is connected to it before working on it.
- Always use a properly rated voltage sensing device to confirm that power is off.

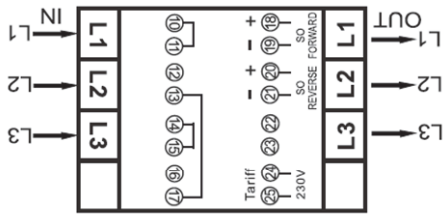
WARNING

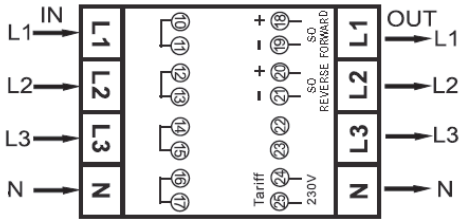
- The installation should be performed by qualified personnel familiar with applicable codes and regulations.
- Use insulated tools to install the device.
- A fuse, thermal cut-off or single-pole circuit breaker should be fitted on the supply line and not on the neutral line.

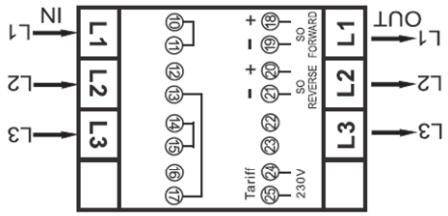
- The connecting wire, connecting the device to the outside circuit, should be sized in accordance with local regulations for the maximum amount of the current breaker or other overcurrent protection devices used in the circuit.
- An external switch or a circuit-breaker should be installed on the supply wires, which will be used to disconnect the meter and the device supplying energy. It is recommended that this switch or circuit-breaker is placed near the meter because that is more convenient for the operator. The switch or circuit-breaker should comply with the specifications of the building's electrical design and all local regulations.
- An external fuse or thermal cut-off used as an overcurrent protection device for the meter must be installed on the supply side wires. It's recommended that this protection device is also placed near the meter for the convenience of the operator. The overcurrent protection device should comply with the specifications of the building's electrical design and all local regulations.
- This meter can be installed indoor, or outdoor enclosed in a meter box which is sufficiently protected, in accordance with local codes and regulations.
- To prevent tampering, an enclosure with a lock or a similar device can be used.
- The meter has to be installed against a fire resistant wall.
- The meter has to be installed in a well-ventilated and dry place.
- The meter has to be installed in a protective box if the meter is exposed to dust or other contaminants.
- The meter can be installed and used after being tested and can be sealed afterwards.
- The device can be installed on a 35mm DIN rail.
- The meter should be installed on a location where the meter can be read easily.
- In case the meter is installed in an area with frequent surges for example due to thunderstorms, welding machines, inverters etc, the meter is required to be protected with a Surge Protection Device.
- The device should be sealed immediately after installing it in order to prevent tampering

5.7 Connection Diagram

<table>
<tr><th></th><th>3P4W</th><th>3P3W</th></tr>
<tr><td>DC Connection</td><td> 

L1 (in) Phase 1 input – L1 (out) Phase 1 output
L2 (in) Phase 2 input – L2 (out) Phase 2 output
L3 (in) Phase 3 input – L3 (out) Phase 3 output
N (in) Neutral input – L1 (out) Neutral output
10/11 not used
12/13 not used
14/15 not used
16/17 not used
18/19 Forward pulse output contact (S0)
20/21 Reverse pulse output contact (S0)
22/23 M-Bus / Modbus communication contact
24/25 External tariff input (230V)</td><td> 

L1 (in) Phase 1 input – L1 (out) Phase 1 output
L2 (in) Phase 2 input – L2 (out) Phase 2 output
L3 (in) Phase 3 input – L3 (out) Phase 3 output
N (in) Neutral input – L1 (out) Neutral output
10/11 not used
12/13 to be connected to 16/17
14/15 not used
16/17 to be connected to 12/13
18/19 Forward pulse output contact (S0)
20/21 Reverse pulse output contact (S0)
22/23 M-Bus / Modbus communication contact
24/25 External tariff input (230V)</td></tr>
<tr><td>CT Connection</td><td> 

CT1 (in) CT1 input – CT1 (out) CT1 output
CT2 (in) CT2 input – CT2 (out) CT2 output
CT3 (in) CT3 input – CT3 (out) CT3 output
UN (in) Neutral input – UN1 (out) Neutral output
10/11 Phase 1
12/13 Phase 2
14/15 phase 3
16/17 not used
18/19 Forward pulse output contact (S0)
20/21 Reverse pulse output contact (S0)
22/23 M-Bus / Modbus communication contact
24/25 External tariff input (230V)</td><td> 

CT1 (in) CT1 input – CT1 (out) CT1 output
CT2 (in) CT2 input – CT2 (out) CT2 output
CT3 (in) CT3 input – CT3 (out) CT3 output
UN (in) Neutral input – UN1 (out) Neutral output
10/11 Phase 1
12/13 Phase 2 – to be connected to 16/17
14/15 phase 3
16/17 to be connected to 12/13
18/19 Forward pulse output contact (S0)
20/21 Reverse pulse output contact (S0)
22/23 M-Bus / Modbus communication contact
24/25 External tariff input (230V)</td></tr>
</table>

For 3P3W (ARON) connection there must be a bridge made between pin 13 and 17.

6 Operation

6.1 Energy flow indication

The red LED on the front panel indicates the power flow measured by the meter. When power flows, the LED will flash. The faster the LED flashes, the more power flows. For this meter, the LED will flash 10.000 times per kWh. The first display indication of the meter in the scrolling mode is either FW (forward) or RV (reverse)

6.2 Re-active energy indication

The dispay will show Kvarh to indicate the meter is measuring re-active energy.

6.3 Tariff indication

The LCD will show either the symbol T1 or T2 in the LCD for the active tariff.

6.4 Reading the meter

Two red LED's on the front panel indicates the consumption measured by the meter, one for active and one for reactive energy. When power is consumed, the LED will flash. The faster the LED flashes, the more power is consumed. For this meter, the LED will flash 10.000 times per kW.

The meter is equipped with a 8 digit LCD. For the energy consumption the meter will display 999999.99 kWh.

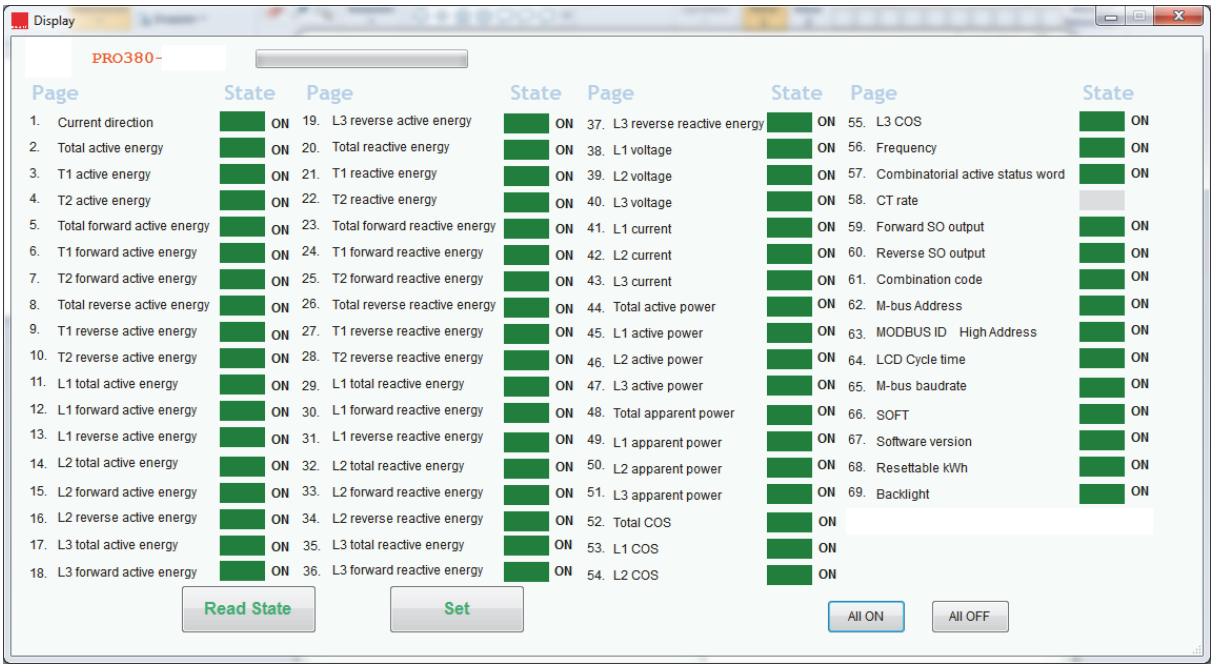
6.5 LCD display of the meter

The LCD is a multifunctional display, it has two rows to indicate the status of the meter. The top row shows the value, while the bottom row shows the units, phase and/or direction.

After power on the first display to be shown is

This page indicates per phase the direction of the energy. In this picture phase 1 is reverse and phase 2 and 3 are forward.

The following pages are available under the buttons, but can also be set in a scrolling mode on the LCD. For changing the displayed pages in scrolling mode, please see our IR manual.


Display
PRO380-
Page State Page State Page State Page State
1. Current direction ON 19. L3 reverse active energy ON 37. L3 reverse reactive energy ON 55. L3 COS ON
2. Total active energy ON 20. Total reactive energy ON 38. L1 voltage ON 56. Frequency ON
3. T1 active energy ON 21. T1 reactive energy ON 39. L2 voltage ON 57. Combinatorial active status word ON
4. T2 active energy ON 22. T2 reactive energy ON 40. L3 voltage ON 58. CT rate
5. Total forward active energy ON 23. Total forward reactive energy ON 41. L1 current ON 59. Forward SO output ON
6. T1 forward active energy ON 24. T1 forward reactive energy ON 42. L2 current ON 60. Reverse SO output ON
7. T2 forward active energy ON 25. T2 forward reactive energy ON 43. L3 current ON 61. Combination code ON
8. Total reverse active energy ON 26. Total reverse reactive energy ON 44. Total active power ON 62. M-bus Address ON
9. T1 reverse active energy ON 27. T1 reverse reactive energy ON 45. L1 active power ON 63. MODBUS ID High Address ON
10. T2 reverse active energy ON 28. T2 reverse reactive energy ON 46. L2 active power ON 64. LCD Cycle time ON
11. L1 total active energy ON 29. L1 total reactive energy ON 47. L3 active power ON 65. M-bus baudrate ON
12. L1 forward active energy ON 30. L1 forward reactive energy ON 48. Total apparent power ON 66. SOFT ON
13. L1 reverse active energy ON 31. L1 reverse reactive energy ON 49. L1 apparent power ON 67. Software version ON
14. L2 total active energy ON 32. L2 total reactive energy ON 50. L2 apparent power ON 68. Resettable kWh ON
15. L2 forward active energy ON 33. L2 forward reactive energy ON 51. L3 apparent power ON 69. Backlight ON
16. L2 reverse active energy ON 34. L2 reverse reactive energy ON 52. Total COS ON
17. L3 total active energy ON 35. L3 total reactive energy ON 53. L1 COS ON
18. L3 forward active energy ON 36. L3 forward reactive energy ON 54. L2 COS ON
Read State
Set
All ON
All OFF

6.6 Scrolling function

6.6.1 Automatic scrolling

Every 10 seconds the meter will display the next programmed data page (depending on the setting)

6.6.2 Change scrolling time by button

Press one of the buttons for 5 seconds during the display of page rt 00 and release the button

After releasing the button the backlight will blink twice OFF/ON to indicate you are in programming mode.
Press the buttons to select the scrolling time (01 to 30 seconds)
After choosing the desired scrolling time release the button and wait 10 seconds to program the new data in the meter

6.6.3 Manual scrolling

By pressing the button you will go through all data pages one by one starting from page 1 (sequence see in above table and is depending on the version of PRO380)

6.6.4 Data table pages

Data tables can be selected ON or OFF for automatic scrolling mode. See IR-manual.

6.7 Changing the CT-ratio (only CT versions)

6.7.1 On MID certified meters,

The initial screen after powering up, will be the warning to setup the CT ratio for this meter.

In default (when not doing any setting) the meter will operate in a 5/5 configuration.

To change the setting choose the applicable value (press the right button) from below list.

To store this setting: hold the buttons for 30 seconds. This will store the selected value **permanently**!

6.7.2 Available settings.

The available settings on the CT-version meter are as followed:

for CT ratio	Choose
5/5	5
40/5	40
50/5	50
60/5	60
75/5	75
100/5	100
125/5	125
150/5	150
200/5	200
250/5	250
300/5	300
400/5	400
500/5	500

for CT ratio	Choose
600/5	600
800/5	800
1000/5	1000
1250/5	1250
1500/5	1500
2000/5	2000
2500/5	2500
3000/5	3000
4000/5	4000
5000/5	5000
6000/5	6000
7500/5	7500

6.8 Back light

The meter is equipped with a blue backlight.

6.8.1 Change the back light setting

Press the right button for 5 seconds during the display of page BL btn and release the button

After releasing the button the backlight will blink twice OFF/ON to indicate you are in programming mode.

Press the button to select the backlight mode;

bl btn	Press button to activate light
bl off	Always OFF
bl on	Always ON

After choosing the desired scrolling time release the button and wait 10 seconds to program the new data in the meter.

6.8.2 Day counter reset

The meter is equipped with a day counter for consumed energy. This is the energy forward calculated and can be reset to zero by the user

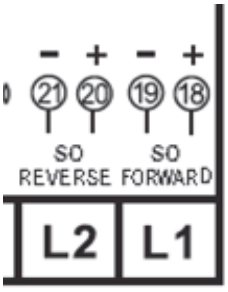
6.8.3 How to reset the day counter back to 0

Press the right button for 5 seconds during the display of page kWh 0 and release the button

After releasing the button the backlight will blink twice OFF/ON and the register is reset to 0.

6.9 S0 pulse output

The energy meter is equipped with two pulse outputs (forward and reverse) which are optically isolated from the inside circuit. It generates pulses in proportion to the measured consumption for purpose of remote reading or accuracy testing. The pulse output is a polarity dependent, open-collector transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (Ui) should be lower than 27V DC. The maximum switching current (Imax) is 100mA. To connect the impulse output, connect 5-27V DC to connector 18/20 (collector), and the signal wire (S) to connector 19/21 (emitter).



pin 18/20 (collector)
pin 19/21 (emitter)

To change the pulse output you need to purchase a IR eye head and PC software from your dealer. Selectable S0 output rates are mentioned in paragraph 6 specifications.

6.10 Setting the total (combined) energy calculation

The meter allows you to display the total energy (usage) shown on the display in accordance to different calculation methods.

CodE 10 indicating that the total energy is the sum of forward - reverse

To change the calculation method used, please use the infra-red eye, which can be bought separately and software which can be downloaded via the website of Inepro. On how to use the infra-red eye to read out values and change settings, a separate manual is available. For this, please contact your local distributor or Inepro Metering bv.

You can use the following calculation methods for total energy as follows:

Code	Total (active) energy
C-01	Forward only
C-04	Reverse only
C-05	Forward + Reverse
C-06	Reverse – Forward
C-09	Forward – Reverse
C-10	Forward – Reverse

6.11 Communicating via the M-bus output(PRO380-Mb only)

The meter is equipped with an M-bus port, the data can be read out via this port. The communication protocol conforms to the EN13757-3 standard.

The meter can communicate with your PC. In order to read out the meter registers first install and configure the PC software. Use an M-bus level converter to connect the PC and the meter. The cable should be connected to terminals 22 and 23. The default primary address of the meter is 001. Secondary addressing is based on the serial number of the meter (last 8 digits).

Note: For more information, see appendix 2

6.12 Communicating via the Modbus output(PRO380-Mod only)

The meter can communicate with your PC. In order to read out the meter registers first install and configure the PC software. Use an RS485 level converter to connect the PC and the meter. The cable should be connected to terminals 22 and 23. The default communication address of the meter is 001.

Note: For more information, see appendix 3

7 Troubleshooting

CAUTION

- During repair and maintenance, do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other conducting material as that will cause an electric shock and possibly cause injury, serious injury or even death.
- Turn off and if possible lock all sources supplying the energy meter and the equipment that is connected to it before opening the protection cover and working on it.
- Turn off and lock all power supply to the energy meter and the equipment to which it is installed before opening the protection cover to prevent the hazard of electric shock.

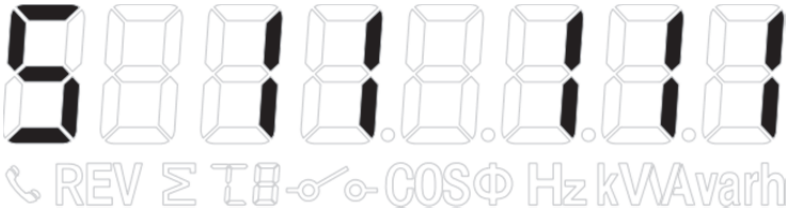
WARNING

- Maintenance or repair should only be performed by qualified personnel familiar with applicable codes and regulations.
- Use insulated tools to maintain or repair the meter.
- Make sure the protection cover is in place after maintenance or repair.
- The case is sealed, failure to observe this instruction can result in damage to the meter.

Problem	Possible cause	Check/Solution
The red consumption LED is not flashing (PULSE LED).	There is no load connected to the meter. The load on the line is very low.	Connect a load to the meter. Check with an Ohm-meter if the load value is very low.
The register doesn't seem to count.	There is almost no load connected to the meter	Check if the red consumption LED is flashing. 10.000 flashes of the LED at 100 pulses per kWh equals 0.01kWh.
No pulse output.	The pulse output is not supplied with DC power. The pulse output is not connected correctly.	Check the external voltage source (Ui) is 5-27V DC with a voltage meter Check if the connection is correct: the 5-27V DC should be connected to the collector connection (pin 20+) and the signal wire (S) to the emitter connection (pin 21-).
The pulse output rate is wrong.	Is the correct pulse rate set via the infra red eye and software?	Download or request the software and use the infra red eye which can be bought separately.
If none of the above works, please contact technical support		

7.1 Errors / Diagnostics display

The meter is equipped with a display field that shows errors and diagnostics. It consists of the character S followed by 2 + 3 digits. The meaning of each digit is as follows:



First digit: Program status (0 fail / 1 passed)

Second digit: Eeprom status (0 fail / 1 passed)

Third digit: Phase A status (0 not available / 1 available)

Fourth digit: Phase B status (0 not available / 1 available)

Fifth digit: Phase C status (0 not available / 1 available)

If the first or second digit shows a 0 (zero); then please return the meter, as the meter is malfunctioning.

If the third, fourth or fifth digit shows a 0 (zero); please check the wiring for power issues.

7.2 Technical support

For questions about one of our products please contact:

- Your local Inepro Metering distributor
- Email: support@ineprometering.com

www.ineprometering.com

1 Appendix PRO380 2 tariff function

How to switch between T1 and T2

The meter is equipped with 2 tariff functionality which need to be activated by an external voltage connected to the terminals 24/25

This is an AC voltage between

2 Appendix PRO380-Mb

The PRO380-Mb can be connected for M-Bus communication. The defaults for Mbus communication are:

- Baudrate 9600 bits/sec
- 8 data bits
- even parity
- 1 stop bit

The M-Bus connection is on the terminals 22/23

The secondary addressing is preset to the last 8 digits of the serial number printed on the side of the meter. However this can be changed to a more convenient number through IR or Mbus communication.

The baudrate can be lowered to values 4800, 2400, 1200, 600 and 300 baud. Data, parity and stop bit cannot be changed.

For the registers used in the meter and how to interpreted the data, see the appendix "Register matrix".

Although INEPRO does not give support on third party software and hardware, we noticed good experiences with Relay products with our customers.

More detailed info on M-Bus can be found:

http://www.m-bus.com/mbusdoc/default.php

3 Appendix PRO380-Mod

The PRO380-Mod can be connected for Modbus communication. The Modbus implementation used is Modbus basic (standard). This means the following:

- Baudrate 9600 bits/sec
- 8 data bits
- even parity
- 1 stop bit

The baudrate can be lower to values 4800, 2400, 1200. Data, parity and stopbit cannot be changed.

The Modbus connection is on the terminals 22/23

When connecting the meter through a serial converter (RS485) for testing, please be aware that because of not implementing the complete Modbus infrastructure, there will be a need to put an additional resistor (120 ohms/ 0.25 watts) across the terminals (22 & 23) on the meter side.

For the registers used in the meter and how to interpreted the data, see the appendix "Register matrix".

Although INEPRO does not give support on third party software and hardware, we noticed good experiences with Moxa products with our customers.

More info on Modbus can be found:

Physical:
http://www.modbus.org/docs/Modbus_over_serial_line_V1_02.pdf

Protocol:
http://www.modbus.org/docs/Modbus_Application_Protocol_V1_1b3.pdf

4 Appendix Infra-Red PC software

All PRO380-series meters are capable to be read out and configured by IR. The standard used is IRDA (IEC62056-21:2002 (IEC1107)).

IR converter and accompanying software are sold separately. Please contact your dealer.

5 Appendix Registry matrix

				PRO380			
Register Address	Contents	Datablocks	HEX response	IR	Mbus	Modbus	
1000	Serial number *	4	signed	R	R/W*	R	* On Mbus models = secondary address
1010	Meter code	2	signed	R	R	R	
1018	Meter ID (Mbus/Modbus)	2	signed	n/a	R/W	R/W	001~247 (001 default; 000 broadcast)
1020	Baud Rate	2	signed	n/a	R/W	R/W	9600 (default), 4800, 2400, 1200, 600, 300
1030	Meter Name	32	signed	R	R	R	
1050	Protocol Version	4	signed	R	R	R	
1054	Software Version	4	signed	R	R	R	
1058	Hardware Version	4	signed	R	R	R	
1060	Meter Amps	2	signed	R	R	R	
1062*	CT Ratio*	2	signed	R	R	R	* Only CT models; Write one time only by button
1066	S0 output rate	4	Float - Big Endian (ABCD)	R/W	R/W	R/W	10000, 2000, 1000 (default), 100, 10, 1, 0.1, 0.01
107A	Combined Code	2	signed	R/W	R/W	R/W	01, 04, 05 (default), 06, 09 and 10
1510	LCD cycle time	2	signed	R/W	R/W	R/W	1~30 (seconds, 10 seconds default)
2008	L1 Voltage	4	Float - Big Endian (ABCD)	R	R	R	
200C	L2 Voltage	4	Float - Big Endian (ABCD)	R	R	R	
2010	L3 Voltage	4	Float - Big Endian (ABCD)	R	R	R	
2020	Grid Frequency	4	Float - Big Endian (ABCD)	R	R	R	
2068	L1 Current	4	Float - Big Endian (ABCD)	R	R	R	
206C	L2 Current	4	Float - Big Endian (ABCD)	R	R	R	
2070	L3 Current	4	Float - Big Endian (ABCD)	R	R	R	
2080	Active Power	4	Float - Big Endian (ABCD)	R	R	R	
2088	L1 Active Power	4	Float - Big Endian (ABCD)	R	R	R	
208C	L2 Active Power	4	Float - Big Endian (ABCD)	R	R	R	
2090	L3 Active Power	4	Float - Big Endian (ABCD)	R	R	R	
20A0	Reactive Power	4	Float - Big Endian (ABCD)	R	R	R	
20A8	L1 reactive power	4	Float - Big Endian (ABCD)	R	R	R	
20AC	L2 reactive power	4	Float - Big Endian (ABCD)	R	R	R	
20B0	L3 reactive power	4	Float - Big Endian (ABCD)	R	R	R	
20C0	Apparent Power	4	Float - Big Endian (ABCD)	R	R	R	
20C8	L1 Apparent Power	4	Float - Big Endian (ABCD)	R	R	R	
20CC	L2 Apparent Power	4	Float - Big Endian (ABCD)	R	R	R	
20D0	L3 Apparent Power	4	Float - Big Endian (ABCD)	R	R	R	
20E0	Power Factor	4	Float - Big Endian (ABCD)	R	R	R	
20E8	L1 Power Factor	4	Float - Big Endian (ABCD)	R	R	R	
20EC	L2 Power Factor	4	Float - Big Endian (ABCD)	R	R	R	
20F0	L3 Power Factor	4	Float - Big Endian (ABCD)	R	R	R	
2200	Tariff	2	signed	R/W	R/W	R/W	01 (t1 saved), 02 (t2 saved), 11 (t1 not saved), 12 (t2 not saved)
3000	Total Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3100	T1 Total Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3200	T2 Total Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3008	L1 Total Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
300C	L2 Total Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3010	L3 Total Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3120	T1 Forward Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3220	T2 Forward Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3028	L1 Forward Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
302C	L2 Forward Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3030	L3 Forward Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3140	T1 Reverse Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3240	T2 Reverse Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3048	L1 Reverse Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
304C	L2 Reverse Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3050	L3 Reverse Active Energy	4	Float - Big Endian (ABCD)	R	R	R	
3160	T1 Total Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
3260	T2 Total Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
3068	L1 Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
306C	L2 Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
3070	L3 Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
3180	T1 Forward Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
3280	T2 Forward Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
3088	L1 Forward Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
308C	L2 Forward Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
3090	L3 Forward Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
31A0	T1 Reverse Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
32A0	T2 Reverse Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
30A8	L1 Reverse Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
30AC	L2 Reverse Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	
30B0	L3 Reverse Reactive Energy	4	Float - Big Endian (ABCD)	R	R	R	